

WE Water Efficiency
Overview

- 1. Water Efficient Landscaping**
- 2. Innovative Wastewater Technologies**
- 3. Water Use Reduction**

- *Reduce the quantity of water needed for the building*
- *Reduce municipal water supply and treatment burden*

The diagram illustrates a water reuse system. It shows a building with various fixtures (sinks, toilets, showers) connected to a wastewater treatment system. The treated effluent is stored in a tank and then distributed to a landscape irrigation system, which includes a pump and a network of pipes leading to a garden area. The system is designed to reduce the need for potable water in landscaping and reduce the burden on municipal water supply and treatment.

Water Efficiency credits encourage the use of alternative means of water technology and distribution in order to reduce the need for potable water. Efforts to attain these credits usually involves high efficiency fixtures and waterless urinals, as well as innovative wastewater technologies to reduce the need for landscape irrigation.

Slide 2

WE


Water Efficiency: Credit 1.1
Water Efficient Landscaping: Reduce by 50%

INTENT: Limit or eliminate the use of potable water, or other natural surface or subsurface water resources available on or near the project site, for landscape irrigation.

Requirements: Reduce potable water consumption for irrigation by 50% (from a calculated mid-summer baseline case).

Irrigation reduction strategies include:

- Xeriscaping (plant drought tolerant plants)
- High-efficiency irrigation
- Capture rainwater
- Recycle wastewater
- Rain sensors
- Climate-based controllers
- Use of condensate
- Drip irrigation
- Use of non-potable municipal water



Bio-retention area

In the U.S., about 340 billion gallons of fresh water are withdrawn per day from rivers, streams, and reservoirs.

Currently in the United States, 30% of the 26 billion gallons of water consumed daily goes into outdoor use, primarily landscaping. This credit seeks to lessen the use of potable water in landscaping. By improving landscaping practices, irrigation can be reduced if not completely eliminated. One way to eliminate irrigation is by maintaining or reestablishing native or adapted plants. This also attracts native wildlife, thus creating a building site integrated with its natural surroundings while lessening the need for fertilizers and pesticides.

Another way of reducing water consumption is through more efficient irrigation systems such as using non-potable water (eg. greywater or rainwater), or using high-efficiency irrigation systems. One example is a drip irrigation system which can be 95% efficient versus ordinary systems that are about 45% efficient.

WE

Water Efficiency: [Credit 1.2](#)
Water Efficient Landscaping: No Potable Water Use or No Irrigation

INTENT: Eliminate the use of potable water, or other natural surface or subsurface water resources available on or near the project site, for landscape irrigation.


No Potable Water Use:

- Captured Rainwater
- Recycled Wastewater
- Recycled Greywater

OR

No Irrigation:

- Install landscape that does not require permanent irrigation (temporary irrigation may be used if removed within one year of installation)



Rainwater and recycled greywater is perfect for irrigation purposes when irrigation must be used. The project can receive an additional point to Water Efficiency Credit 1 by not installing any irrigation devices at all. Irrigation may not be necessary with native and adapted plants as they are adapted to the local environment's rainwater levels and better suited to the building environment. These strategies save money on the project and have the potential to save multiple gallons of water per year depending on the project's climate zone.


* Please note: Well water is considered potable for this credit.

WE

Water Efficiency: Credit 1: Strategies
Water Efficient Landscaping

Water Resource Strategies:

- Use of water-conserving irrigation systems
- Use of captured rainwater
- Use of condensate
- Use of gray water
- Use of native / adapted plant species
- Use of non-potable municipal water
- Biological nutrient removal systems
- Constructed wetlands
- High-efficiency filtration systems



Emory University Whitehead Biomedical Research Building's underground cistern

* Emory University uses several water efficient strategies in their new Whitehead Building. For example, recovered condensate provides for 20-25% of their cooling tower make up water, which is the cleanest water for cooling tower maintenance. A cistern captures rainwater off of the roof and uses it for irrigation. Cistern water for irrigation is supplementing stormwater. The economics of these systems are very effective: water savings is high for both Emory and the municipality.

WE

Water Efficiency: **Credit 2**
Innovative Wastewater Technologies



INTENT: Reduce generation of wastewater and potable water demand, while increasing the local aquifer recharge.

Option 1

- Reduce potable water for sewage conveyance by 50% through the use of water conserving fixtures or non-potable water.

Option 2

- Treat 50% of wastewater to tertiary standards on site.



On-site wastewater plant

This credit refers to water used for wastewater only. The goal of this credit is to lessen the amount of water being sent to the waste water treatment center. This can be done through efficient fixtures, but the primary goal is to look at using non-potable water or to treat the wastewater onsite. By doing this, it lessens the load and amount of energy the municipality uses on processing wastewater.

There are many technologies available that will help achieve this credit, however, using technologies such as dual flush toilets and waterless urinals alone are not sufficient. The project usually has to incorporate use of greywater or stormwater capturing systems for other water needs, such as flushing toilets. These processes help transform perceived waste into resources that can be used on the building site. For instance, on-site wastewater systems can provide potable water or non-potable water, as well as natural fertilizers. If you achieve this credit, the water savings can contribute to Water Efficiency Credit 3 as the overall water use reduction.



WE

Water Efficiency: Credit 3.1

Water Use Reduction: 20% Reduction

INTENT: Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

REQUIREMENT: Demonstrate that the building (not including irrigation) will use 20% less water use than baseline calculated to meet the **Energy Policy Act of 1992** fixture performance requirements for water closets, urinals, lavatory faucets, showers, and kitchen sinks.



Low Flow Shower Head

Dual Flush Toilet

Energy Policy Act of 1992: Established minimum energy and water efficiency levels for classes of covered products.

This credit applies to reducing potable water use within the building. Although water efficient machines such as clothes washers, dishwashers, refrigerators and other water using machines are good in saving water, they are considered processed water and are not included in the calculation for the 20% water use reduction. The fixtures that are included are toilets, lavatories, and showers. The basis of this credit includes comparing the project design case to a baseline case. The baseline case is calculated using the lowest efficiency water fixtures allowed under the Energy Policy Act of 1992.


WE

Water Efficiency: [Credit 3.2](#)
Water Use Reduction: 30% Reduction


WE credit 3.2 has the same requirements as WE credit 3.1 except water reduction must be 30% less.

Design Strategies:


- High-efficiency fixtures
- Occupant sensors
- Rainwater/ Gray water systems for non-potable applications (e.g. flushing toilets, custodial uses and mechanical systems)
- Dry fixtures
 - Composting toilets
 - Waterless urinals



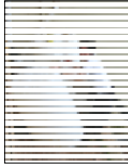
Composting toilet



Waterless urinal

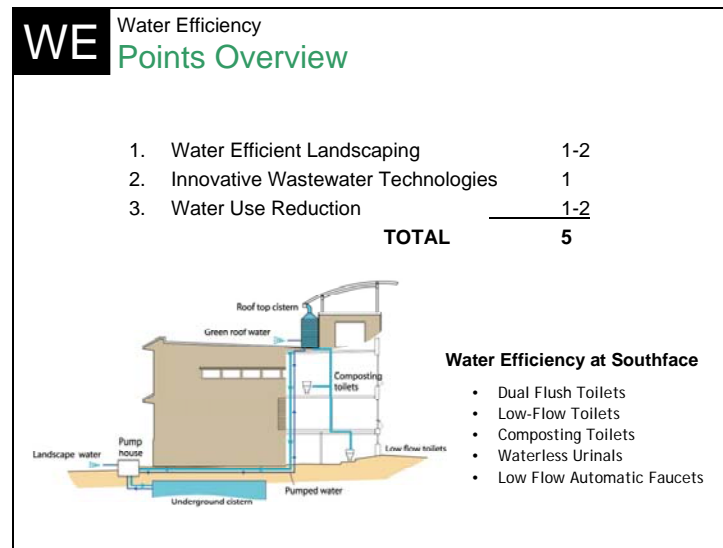


Rain Water Harvesting



Rainwater collection

To score another point for water efficiency measures, in addition to WE Credit 3.1, increase the overall water reduction of the building to 30%. It is possible for most projects that have water efficient fixtures combined with reclaimed water for toilet flushing to increase the efficiency to a 40% reduction in water us. This would earn the project an Innovation in Design point. Due to the limited number of credits available in the LEED program, looking at ways to improve water efficiency is a great way to achieve Innovation in Design points.



Water Efficiency at the Southface Eco Office:

WE 1.1: Water Efficient Landscaping: No potable water for irrigation. Native, Drought resistant Landscaping as well as rain water and gray water used for green roof. **2 points**

WE 2: Innovative Wastewater Technologies: Water Efficient Fixtures, Using Rain Water and Gray Water for toilets, as well as use of a retention pond for wastewater treatment. 80% reduction (52% without rooftop cistern) **1 point**

WE 3.1, 3.2: 74% Water Use Reduction through: Water Efficient Fixtures and using rain water and gray water for toilets. **2 points**

ID 1: Innovation in Design: Exemplary Water Use Reduction (WE 3) **1 point**, Possible Exemplary Innovative Wastewater (WE 2) **1 point**

* Rain Water and Gray Water Collection for all toilets, cooling mechanical heat exchangers, and irrigation.

Retention Pond using a bio-remediation process.

Base Case – 201,000 gal/year

Design Case – 88,219 gal/year

Reduction – 112,781 gal/year